



# 3D Movies and Photos on a Shoestring

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## TOOLS:

- [Screwdrivers \(2\)](#)  
*[one small, one large](#)*



## PARTS:

- [Webcams \(2\)](#)  
*[I bought these refurbished for \\$15 each. This is a good webcam for this project due to its small size and focusable lens.](#)*
- [Brackets \(2\)](#)
- [Mending plates \(1\)](#)  
*[with 4 mounting holes](#)*
- [Turnbuckle \(1\)](#)
- [Hot shoe mount/tilt attachment for camera \(1\)](#)  
*[such as the ePhoto Adjustable Swivel Hot Shoe Mount FT9712H, available from Amazon](#)*
- [Tripod \(1\)](#)  
*[such as the GorillaPod Magnetic. #MKJB01 from Maker Shed \(makershed.com\)](#)*
- [Machine screws \(1\)](#)

- [Nuts \(5\)](#)
- [Washers \(4\)](#)
- [Acorn nut \(1\)](#)
- [Contact cement \(1\)](#)
- [Computer \(1\)](#)
- [3D capture software \(1\)](#)  
*[such as Stereoscopic Multiplexer and Player \(3dtv.at\) or Onuprova 3D Camera \(redcyan3d.codeplex.com\), depending on whether you're making video or stills](#)*
- [3D glasses \(1\)](#)
- [USB extension cables \(2\)](#)  
*[The webcam cables are a bit short.](#)*

## SUMMARY

3D video camcorders and displays are getting cheaper, but they're still fairly expensive, and the only sub-\$100 cameras that take 3D still photos all use roll film. So I thought it would be fun to mix the old with the new and see how cheaply I could build a digital camera rig for creating old-school red-blue 3D stills and video.

My design goals included real-time preview ability, focus and parallax control, and perhaps most importantly, compatibility with my daughter's Barbie and the Magic of Pegasus 3D glasses.

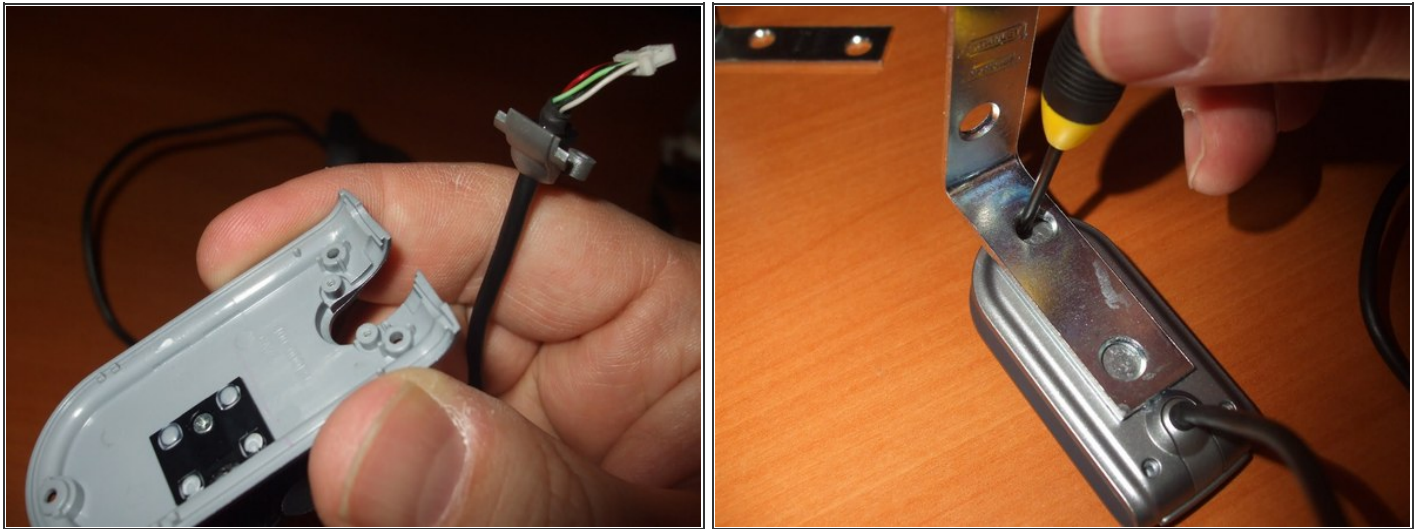
Good old red-blue anaglyphic 3D works on ordinary screens, can be printed using any color printer, and requires only super-cheap glasses for viewing. You can't do all that with the polarization-based 3D that movies use today. And there's free, easy-to-use software that lets you create anaglyphic 3D from stills and video captured with ordinary digital cameras. Looking at 3D is fun, and it's even more fun when you've shot it yourself.

## Step 1 — Hardware and Software for 3D Stills and Video



- For video and lower-resolution stills, an easier hardware setup is a Windows laptop with 2 USB webcams plugged in. You can shoot and produce 3D video using Peter Wimmer's Stereoscopic Multiplexer and Stereoscopic Player software (free trial version at <http://3dtv.at>; register for full functionality and to remove watermarks), or you can capture and produce 3D stills using the free Onuprova 3D Camera software (<http://redcyan3d.codeplex.com>).
- With a webcam-laptop setup, you need to keep the 2 webcams securely positioned and lined up precisely. Here's how I put together a fun and easy 3D capture rig for around \$35. As a first-time maker, I'm proud to introduce the Frankencam3D.

## Step 2 — Build the Frankencam3D.



- To remove the clamp on each webcam, unscrew the 3 screws in back. Lift away the back cover and gently unplug the USB cable's connector from the circuit board. Remove the 2 screws that hold the cable clip and slide it away to separate it and the cable from the back cover. Pop the clip off the back cover by pressing the cover against a flat surface.
- Mount the brackets to the back covers with contact cement, aligning them by positioning the upper edge of the metal where the bevel for the cable starts. The cover's straight sides make a nice guide for vertical alignment, and a hole in each bracket allows access to the lower mounting screw. (I returned the screw to its hole before this step to make reassembly easier.)
- Replace the USB cables on both camera covers, plug the cables into the circuit boards, and screw the covers back onto the cameras.

### Step 3



- Mount the camera brackets to the mending plate using the plate's first and third holes (shown on page 16). This approximates the distance between your eyes, for a realistic 3D effect. Then link the back ends of the camera brackets with the turnbuckle, using the flat-head screws.
- Unscrew the top and bottom parts of the hot shoe mount so that you're left with only the pivot joint. Screw this joint onto the tripod, screw a nut on top, then fit the camera rig over the nut and secure it with the acorn nut. Finally, hook up the USB cables to your laptop. That's it — the rig is ready to go.
- The Logitech cameras include a velcro wrap on the USB cables, which you can use to neatly manage the rig's wires. The turnbuckle in back lets you experiment with the rig's parallax control, fine-tuning the cameras' angles to achieve more precise 3D effects.



## Step 4 — Making 3D Movies



- To capture and produce 3D video with Stereoscopic Multiplexer, first select the 2 USB cameras in the configuration wizard under the Driver menu. The software will display the live webcam feeds side-by-side; make sure the order is correct (left and right), then turn the camera lenses to manually focus each one.
- Close Stereoscopic Multiplexer.
- Open Stereoscopic Player and select File → Live Playback/Stereo-scopic Multiplexer to display your live stereo image. Under Settings, choose the Optimized Anaglyph Red-Cyan playback option, and test the image with your 3D glasses. Now you can compose your shot, readjust the focus if needed, and experiment with the parallax to see what works best.
- When you're satisfied with the image, close Player and relaunch Multiplexer. Now you can record video clips by clicking the Record and Stop buttons. You can view your clips back in Stereoscopic Player, in a number of 3D video formats.
- Onuprova 3D Camera works basically the same way, and also has a shutter button for capturing 3D stills.
- That's it. You're now officially a 3D photographer or moviemaker! Many factors will impact your results, including distance from the lens, severity of parallax, focus, and lighting. So start experimenting, and by all means, find ways to improve your rig.

## Step 5 — Other Methods: The Stereo Shuffle Method

- The easiest way to start making your own 3D photos is the *stereo shuffle*, described by Bill Coderre in [MAKE Volume 06](#) (page 143).
- Take your digital camera outside and find a scene with a fun variety of distances to focus on. The closest objects should be at least 5 feet away, and perfectly still. Also, make sure that everything in the scene will be in sharp focus. Sunny conditions will help your depth of field.
- Ready? Hold the camera to your eye, and lean very slightly to the left. Snap a picture. Lean very slightly to the right, and snap another picture. That's your basic *stereo shuffle* right there.
- Avoid scenes where there's a lot movement, because you capture the 2 images at slightly different times. And as with all images that are destined for red-blue anaglyphic, whether stills or video, avoid subjects that are red or pink, or have vertical stripes. (Zebra stripes make perceiving depth with binocular vision more difficult, a feature which helps protect zebras from predators, especially when they're clustered together and running.)
- Another fun source of 3D stereo pairs is any 2D movie that you can watch on your computer screen. Grab 2 frames from any horizontal tracking shot, and use them to create a 3D scene.

## Step 6 — The Twin Camera Still Photos Method

- To take high-quality 3D photos, you need 2 camera lenses capturing the image at the same time, either on a special 3D camera (the non-film ones are expensive) or on 2 regular cameras that you synchronize.
- For high-end still cameras, you can find twin camera controller plans and products at the Ledametrix Digital Stereo Photography website (<http://ledametrix.com>).

## Step 7 — Anaglyph Photo Software

- You can use free software to create a red-blue anaglyph out of 2 images, such as StereoPhoto Maker (<http://stereo.jpn.org/eng/stphmkr>), which is Windows-only, and Anabuilder (<http://AnaBuilder.free.fr/welcomeEN.html>), which runs cross-platform.
- These programs remove red tones from the right image, remove green and blue (cyan) tones from the left image, and combine them into a 3D image that you view with red-cyan 3D glasses. Parts of the image that appear dark to the left eye and light to the right will look cyan, and areas that look light to the left eye and dark to the right will look reddish.
- StereoPhoto Maker aligns the left and right photos into a combined stereo anaglyph automatically and can generate them in batches.
- With AnaBuilder, you need to align each image pair manually. Using the arrow controls, you move, stretch, and rotate the left image against the right, so that all objects align horizontally, and the closest point on the nearest object has its 2 views superimposed. This puts it at “window depth,” which is easier to view. You can experiment with “eye poking” 3D, such as phantagrams, later.

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